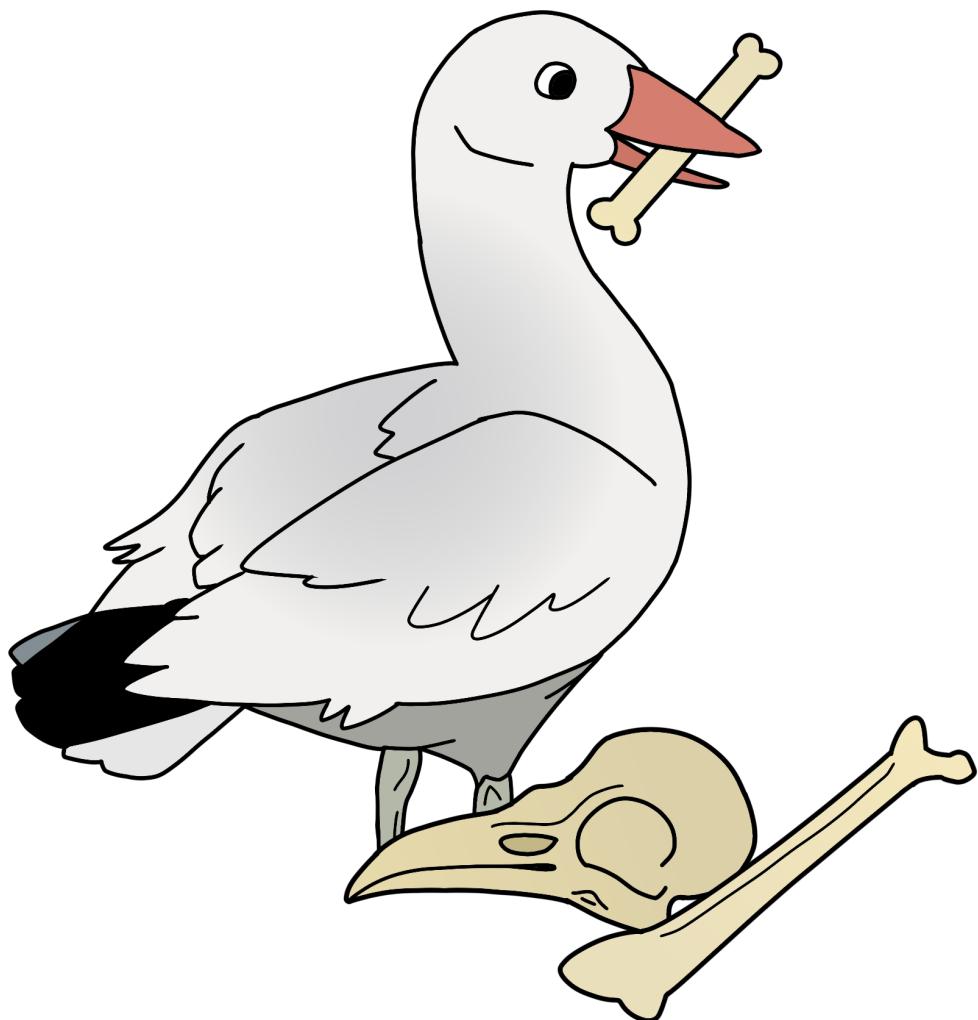


BIRDSO Anatomy 2021-2022



You will have 50 minutes for this test.

You may have one 8.5" x 11" sheet of paper double-sided with information.

Feel free to contact me with questions, comments, etc. at izachar9@jhu.edu

1. What effect would a lesion between the chorda tympani and nerve to the stapedius muscle have on salivation, taste, or hearing?(1)

- A. Patient cannot salivate but has full function of taste along with slight sound sensitivity
- B. Patient may suffer from hyperacusis, becoming overly sensitive to sound
- C. Patient experiences loss of taste on their palate and loss of tears due to lacrimal damage
- D. Patient has no taste in anterior ⅓ of their tongue with reduced salivation**

2. What nerves does the synapse in the solitary nucleus receive taste information from?(3)

CNs VII, IX, and X

3. What type of papillae are responsible for the tongue's bumpy appearance?(1)

- A. Filiform Papillae**
- B. Fungiform papillae
- C. Foliate papillae
- D. Circumvallate papillae

4. Explain two components of the survival value of taste.(4- 2 for each)

Varies: it is a system for detecting nutrients, might signal poisons (within bitter food), sour taste can be used to detect acidic solutions that may be harmful, our bodies need sodium and sugar to survive (tasting salt and sweetness)

answer must tie back to survival value (cannot just say sweet=good- how does that aid in our survival?)

5. Which layer of the adrenal cortex produces glucocorticoids? (1)

- A. Zona glomerulosa
- B. Zona fasciculata**
- C. Zona reticularis

6. Which layer produces mineralocorticoids?(1)

- A. Zona glomerulosa**
- B. Zona fasciculata
- C. Zona reticularis

7. What molecule is necessary for the synthesis of mineralocorticoids?(1)

- A. Aldosterone**
- B. Dehydroepiandrosterone
- C. Estradiol
- D. Estriol
- E. Dehydroepiandrosterone sulfate

8. Renin converts angiotensinogen to Angiotensin I, which is then converted to Angiotensin II. How does Angiotensin II increase blood pressure? (4)

Angiotensin II stimulates aldosterone to be produced and secreted to increase the blood pressure by retaining sodium to passively hold water and increase the blood volume which increases the blood pressure.

Match the following descriptions to the type of insulin:

Please type the corresponding letter to the answer (A, B, C, D)

A = Rapid-acting insulin analog

B = Short-acting (soluble insulin)

C = Intermediate/long-acting insulin (isophane or zinc insulin)

D = Long-acting insulin analogue

9. (1.00 pts)

Has an onset of 30-60 min

D

10. (1.00 pts)

Lasts 4-8 hours

B

11. (1.00 pts)

Looks like a clear solution

B

12. (1.00 pts)

Usually injected at the start of a meal

A

13. (1.00 pts)

Usually taken once per day

D

14. (1.00 pts)

Controls glucose levels between meals

C

15. (2.00 pts)

These two types can be combined

BC

16. (1.00 pts)

What is a “hot spot” on a thyroid scan?

A) An indication of the presence of a cyst or cancer

B) An area of failure of iodine concentration

- C)A functioning adenoma
D)An area of increased TBG

17. (4.00 pts)

Christina wants to go sailing with her friends, but she often feels sea sick and does not understand why. Her doctor tells her that this is due to a sensory conflict. Elaborate on the doctor's explanation by explaining this sensory conflict and apply it to sea sickness.

The hair cells in the vestibular apparatus are firing because of movement (1), but sensory receptors in Christina's spine and joints tell her brain that she is sitting still (1). On a rocking boat, her vestibular senses tell her she is moving up and down, but her eyes tell her brain that she is sitting still. This disconnect causes a feeling of sickness. (2)

18. (2.00 pts)

According to doctors, 80% of taste disorders are really smell disorders. What are two possible causes of taste disorders not correlated with smell?

Answer varies. Possible answers include head injury, poor oral/dental hygiene, respiratory tract infection, etc.

For the following section, name which disease is depicted in the photos. (1 pt each)

19. Graves' Disease



20. Myxedema



21. Cerebral Palsy



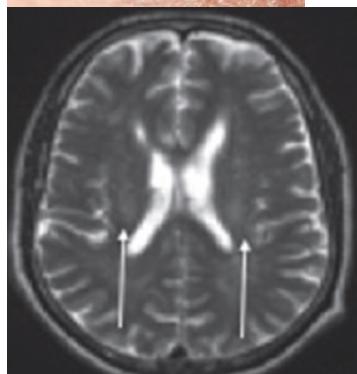
22. Macular Degeneration



23. Glaucoma



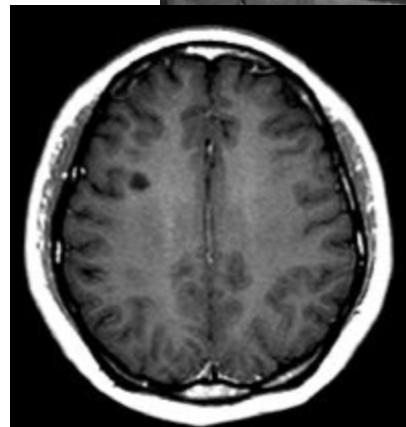
24. Amyotrophic Lateral Sclerosis



25. Cretinism (Congenital Iodine Deficiency Syndrome)



27. Multiple Sclerosis



27. A 20 year old woman enters the doctor's office with complaints about recent weakness and blurred vision. As she sits in the chair, you notice that she is visibly sweating and that her skin appears to be clammy. While waiting for treatment, she complains about being hungry and is quickly irritable. When asked about her recent health, she reports to have had two seizures over the past few weeks. What do these symptoms seem to correlate to? (3)

Hypoglycemia

28. What is the medical term used for her sweating? (1)

Diaphoresis

29. What is the name of the rule commonly applied to treat this condition that you may recommend to this patient? (2)

15-15 Rule

30. A patient with dysgeusia enters the office after experiencing drastic weight loss. The patient expresses to the training medical student that they do not want to eat due to the constant bitter taste of food. The student offers advice of adding lemon juice when marinating meat, adding more seasoning to food, and onions or garlic to enhance the taste of herbs or vegetables. What is wrong with the student's recommendations to a patient with dysgeusia? (3)

Adding more seasoning may cause gastric irritation for the patient and does not necessarily aid in reducing the bitterness caused by dysgeusia.

31. A 45-year old Caucasian woman enters with complaints of a "spinning" sensation around him and hearing ringing constantly. She often feels nauseous and reports to have constant migraines. As she is sitting down, you notice that her eye tends to move rapidly, seemingly involuntarily. As you ask about her health, she reports to have a high-sodium diet. What do you diagnose her with, based on this information?(3)

Meniere's Disease (1pt for vertigo since they are so closely related)

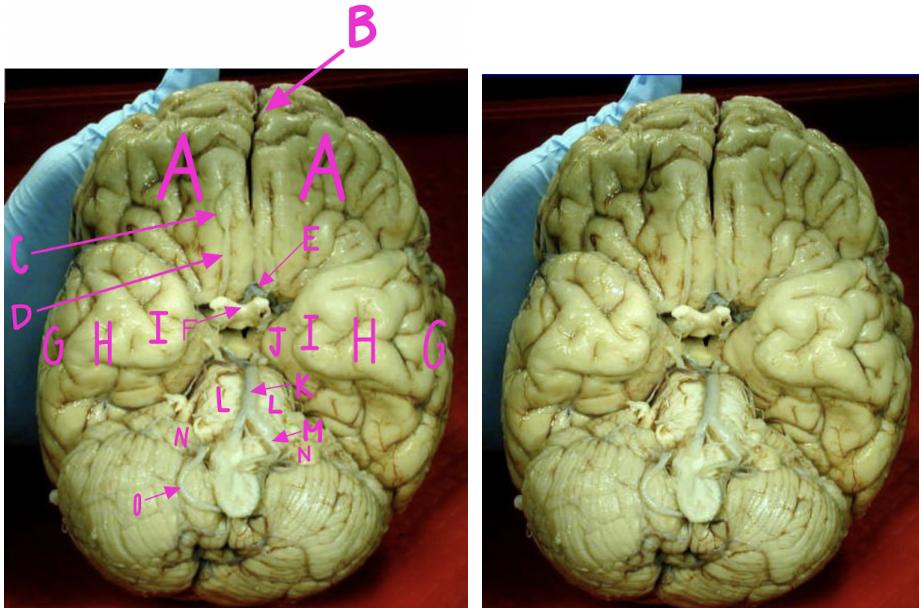
32. You are not sure of your diagnosis, so you decide to perform a Fukuda marching step test on this patient, and the result seems to be consistent with your diagnosis. What was the test result? (2)

Positive

33. Just to be sure, you decide to perform one more test on your patient. You move her from sitting to supine, with her head angled at 45 degrees to one side and then the other, all while observing for nystagmus. What is this test called? (2.50)

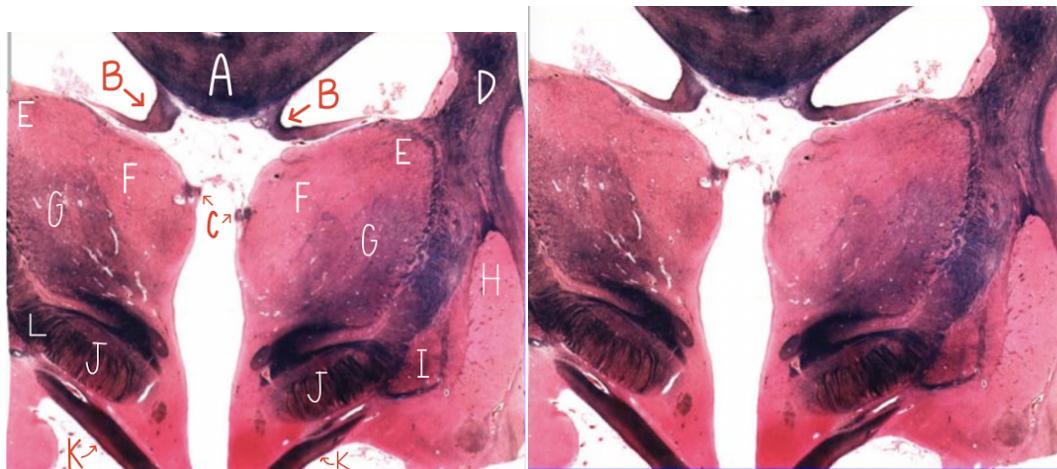
Dix-Hallpike Test

34. (15 pts)



- A: Orbital Frontal Cortex
- B: Gyrus Rectus
- C: Olfactory Bulb
- D: Olfactory Tract
- E: Anterior Cerebral Artery
- F: Optic Nerve/Optic Chiasm
- G: Middle Temporal Gyrus
- H: Inferior Temporal Gyrus
- I: Occipitotemporal (fusiform) Gyrus
- J: Parahippocampal Gyrus
- K: Basilar Artery
- L: Basal Pons
- M: Vertebral Artery
- N: Flocculus
- O: Posterior Inferior Cerebellar Artery (PICA)

35. (12 pts)



A: Corpus Callosum

B: Fornix

C: Stria medullaris thalami

D: Internal capsule

E: Lateral posterior nucleus

F: Dorsomedial (mediodorsal) thalamic nucleus

G: Ventral lateral thalamic nucleus

H: Putamen

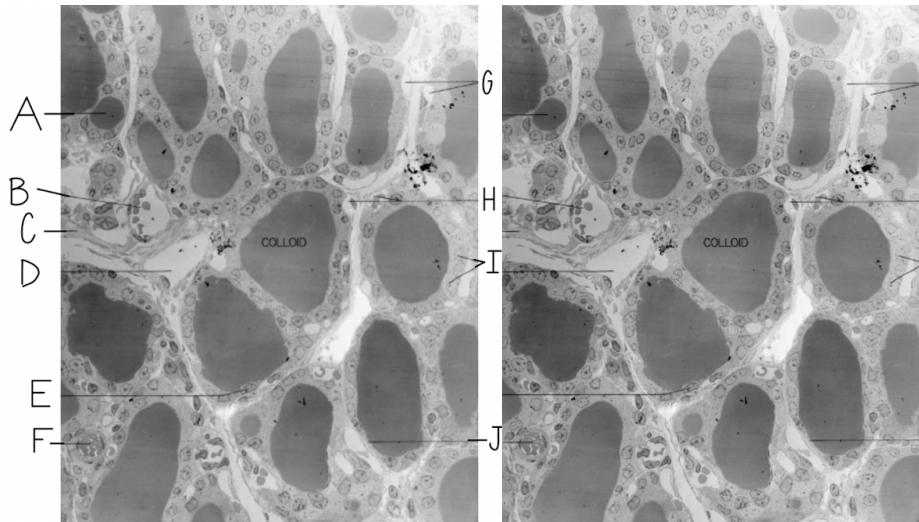
I: Globus pallidus

J: Crus cerebri (cerebral peduncle)

K: Optic tract

L: Lenticular fasciculus

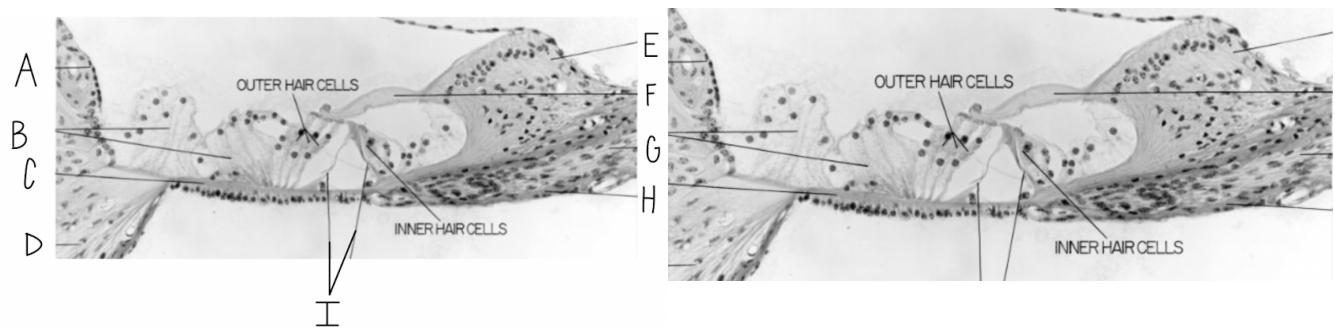
36. (10 pts)



Thyroid Gland Follicle

- A: Budding Follicle**
- B: Venule**
- C: Connective tissue septum**
- D: Lymphatic Capillary**
- E: Flat Epithelium**
- F: Arteriole**
- G: Capillaries**
- H: Capillaries indent epithelium**
- I: High (cuboidal) epithelium**
- J: Flat (squamous) epithelium**

37. (9 pts)



A: Spiral prominence

B: Cells of Hensen

C: Basilar membrane

D: Spiral ligament

E: Limbus

F: Tectorial membrane

G: Cochlear nerve

H: Osseous spiral lamina

I: Pillar cells

38. (1.00 pts)

What type of neurotransmitter do inhibitory neurons release?

A)Norepinephrine

B)Dopamine

C)GABA

D)Glutamate

39. (1.00 pts)

What type of neurotransmitter do excitatory neurons release?

A)Glutamate

B)GABA

C)Dopamine

D)Norepinephrine

40. (1.00 pts)

What prefix is used for defects of the green cone system?

- A)Trit-
- B)Deuter-**
- C)Prot-
- D)Slo

41. (1.00 pts)

How many types of modified epithelial cells are found in most taste buds?

2

42. (1.00 pts)

What type of cells produce cerebrospinal fluid?

- A)Schwann cells
- B)Oligodendrocytes
- C)Astrocytes
- D)Ependymal cells**

43. (1.00 pts)

Where does main separation of cerebrospinal fluid from the blood occur?

- A)Choroid plexus**
- B)Cisterna magna
- C)Subarachnoid space
- D)Arachnoid villi

44. (2.00 pts)

Jim recently underwent a surgery in which one component was a neurorrhaphy. His friend told him this refers to the suturing of a nerve together, but his surgeon gives him a more accurate description of what a neurorrhaphy is. What might this be?

It is the suturing of the connective tissue sheath around the nerve, not the actual nerve itself.

45. (3.00 pts)

What are the three fluid-filled canals in the cochlea?

Vestibular Duct, Cochlear Duct, Tympanic Duct

46. (2.00 pts)

What is the correct order in which a light ray passes through the eye's refractory media?

(Mark ALL correct answers)

- A)cornea> vitreous humor> lens> aqueous humor
- B)vitreous humor> lens> aqueous humor> cornea
- C)cornea> aqueous humor> lens> vitreous humor**
- D)aqueous humor> lens> cornea> vitreous humor

47. (1.00 pts)

What sense uses the glossopharyngeal nerve (IX) to transfer information?

- A)**Taste**
- B)Smell
- C)Sight
- D)Touch
- E)Sound/Hearing

48. (1.00 pts)

Which sense does not transmit to the cerebral cortex via the thalamus?

- A)Taste
- B)Smell**
- C)Sight
- D)Touch
- E)Sound/Hearing

49. (1.00 pts)

Around how many capillaries are found in the lens? (enter a number estimate)

0

50. (2.00 pts)

Sarah's Rinne Test resulted in bone conduction being heard longer than air conduction in one ear.

What does this imply?

Conductive hearing loss in the tested ear

51. (3.00 pts)

A patient has a palpebral fissure that varies from what is expected. What is a palpebral fissure and what does this variation in the patient likely indicate?

It is the distance between the upper eyelid and lower eyelid. (1) If the distance is not equal (varies from normal), it may be caused by a stroke. (2)

52. (1.00 pts)

When taking down a patient's medical history, they tell you they take propylthiouracil daily.

Which condition do they most likely have (or had)?

- A)Cushing's syndrome
- B>Addison's disease
- C)Graves' disease**
- D)Myxedema

53. (3.00 pts)

Hormones are a class of signaling molecules regulated by the endocrine system. Describe the three main classes of hormones.

The three main classes of hormones are protein/peptide hormones, amine hormones (amino acid derivatives), and steroid hormones (including lipid derivatives like prostaglandins).

One point is awarded for each class identified.

54. (1.00 pts)

Distinguish between gray and white matter.

Gray matter is composed of unmyelinated nerve fibers, while white matter is composed of myelinated nerve fibers

55. (1.00 pts)

Which of the following are inhibitory neurotransmitters? Select all that apply.

(Mark ALL correct answers)

A)Serotonin

B)Glutamate

C)Epinephrine

D)GABA

56. (1.00 pts)

What is the all-or-none law?

A nerve will always fire an action potential of the same magnitude no matter the size of the initial stimulus.

57. (3.00 pts)

List the three auditory ossicles in order from largest to smallest.

Malleus, Incus, Stapes (accept hammer, anvil, stirrup)

58. (1.00 pts)

Which of the following is the primary psychoactive compound in cannabis?

A)Cannabidiol (CBD)

B)Cannabicitran

C)Cannabidivarin

D)Tetrahydrocannabinol (THC)

59. (3.00 pts)

What is the difference between place and volley theory?

Place theory suggests that the perception of frequency is dependent on where the vibrations are produced in the basilar membrane. Volley theory suggests that neurons fire action

potentials slightly out of sync with each other, which when interpreted together, can produce a greater variation of frequencies than one neuron alone.

60. (4.00 pts)

Compare and contrast rods and cones, listing two similarities and two differences.

Both are light-absorbing photoreceptors, while rods are responsible for achromatic vision and cones are responsible for color vision. Rods are also not found in the fovea, while cones are. Any valid similarities and differences should be accepted.

61. (1.00 pts)

What portion of the inner ear is involved in balance?

Vestibular system

62. (1.00 pts)

Which of the following elements is essential for proper thyroid function?

A)Phosphorus

B)Iodine

C)Bromine

D)Sulfur

63. (1.00 pts)

True or false: Sodium/potassium pumps pump three K⁺ ions into the cell and two Na⁺ ions out of the cell.

False

64. (2.00 pts)

A 65 year old patient comes to you presenting a painful rash in a stripe on their neck. When asked about the progression of the disease, the patient responds that they had experienced some tingling and pain in the area of the rash prior to its appearance. Identify a potential diagnosis and propose one method of treatment.

The patient likely has shingles, and valid treatment options include prescribing analgesics and antivirals.

65. (1.00 pts)

During which stage of sleep do most dreams occur?

REM sleep

66. (1.00 pts)

True/false: At resting potential, the inside of the neuron is more negative than the outside.

True

67. (1.00 pts)

Which of the following structures is used to sense light touch?

- A)Pacinian corpuscles
- B)Meissner's corpuscles
- C)Merkel's disk**
- D)Ruffini endings

68. (1.00 pts)

Which of the following structures is used to sense light pressure and low-frequency vibrations?

- A)Pacinian corpuscles
- B)Meissner's corpuscles**
- C)Merkel's disk
- D)Ruffini endings

69. (1.00 pts)

Which of the following structures is used to sense stretch in the skin?

- A)Pacinian corpuscles
- B)Meissner's corpuscles
- C)Merkel's disk
- D)Ruffini endings**

70. (1.00 pts)

Which of the following structures is used to sense deep pressure and high-frequency vibrations?

- A)Pacinian corpuscles**
- B)Meissner's corpuscles
- C)Merkel's disk
- D)Ruffini endings

71. (3.00 pts)

Which of the following is/are effect(s) of growth hormone?

(Mark ALL correct answers)

- A)Growth of bone and muscle**
- B)Decreased glucose uptake in muscle**
- C)Decreased insulin secretion
- D)Increased fatty acid oxidation**
- E)Increased salt concentration in the medulla

72. (1.00 pts)

Which of the following is the target of follicle stimulating hormone and luteinizing hormone?

- A)Hypothalamus
- B)Adrenal cortex
- C)Thyroid
- D)Gonads (testes and ovaries)**
- E)Epidermis

73. (3.00 pts)

Which of the following statements is/are notable of the hypophyseal portal system?

(Mark ALL correct answers)

- A)It connects the hypothalamus to the posterior pituitary gland
- B)It allows introduction of hormones from the hypothalamus into systemic circulation**
- C)Gonadotropin-releasing hormone (GnRH) is released by the hypothalamus**
- D)Corticotropin-releasing factor (CRF) is released by the pituitary gland

74. (3.00 pts)

Which of the following hormones is released by the posterior pituitary gland?

(Mark ALL correct answers)

- A)Growth hormone (GH)
- B)Thyroid-releasing hormone (TRH)
- C)Gonadotropin-releasing hormone (GnRH)
- D)Oxytocin**
- E)Vasopressin**
- F)Prolactin

75. (3.00 pts)

Which of the following hormones is released by the anterior pituitary gland?

(Mark ALL correct answers)

- A)Antidiuretic hormone (ADH)
- B)Growth hormone (GH)**
- C)Aldosterone
- D)Adrenocorticotropic hormone (ACTH)**
- E)Thyroid stimulating hormone (TSH)**
- F)Calcitonin

76. (2.00 pts)

Iodine deficiency is associated with hyperthyroidism.

False

77. (2.00 pts)

Patients with hyperthyroidism are often treated with radioactive iodine, used to supplement low iodine levels.

False

78. (2.00 pts)

Triiodothyronine (T3) is produced by the follicular cells while thyroxine (T4) is produced by the parafollicular cells.

False

79. (2.00 pts)

Which of the following is/are true of calcitonin? Select all that are true.

(Mark ALL correct answers)

- A)Produced in the anterior pituitary gland
- B)Decreases plasma calcium levels**
- C)Decreases calcium excretion
- D)Decreases calcium absorption in the gut**
- E)Increases calcium breakdown in bones

80. (2.00 pts)

Increased triiodothyronine (T3) and thyroxine (T4) causes increased thyroid releasing hormone (TRH) levels and decreased thyroid stimulating hormone (TSH) levels.

False

81. (2.00 pts)

Which of the following is/are true of oxytocin? Select all that are true.

(Mark ALL correct answers)

- A)Produced and secreted by the posterior pituitary gland
- B)Involved in uterine contraction and lactation**
- C)Causes decreased perception of pain and responsible for a "runner's high"
- D)Involved in a positive feedback loop**

82. (2.00 pts)

Which of the following is/are true of cortisol/cortisone? Select all that are true.

(Mark ALL correct answers)

- A)Increases blood glucose**
- B)Is a mineralcorticoid
- C)Increases inflammation
- D)Decreases immune response**
- E)The "stress hormone"**

83. (2.00 pts)

Which of the following is/are true of aldosterone? Select all that are true.

(Mark ALL correct answers)

- A)Is a corticosteroid**
- B)Causes increased sodium reabsorption**
- C)Causes decreased blood volume
- D)Secretion pathway involves juxtaglomerular cells**
- E)Blood pressure and sodium are in a positive feedback loop

84. (2.00 pts)

Which of the following is/are true of norepinephrine? Select all that are true.

(Mark ALL correct answers)

- A)Parasympathetic response
- B)Longterm stress hormone
- C)Increases heart rate and blood flow**
- D)Dilation of pupils**
- E)Bladder relaxation**
- F)Digestion stimulated

85. (1.00 pts)

Epinephrine and norepinephrine are secreted by the adrenal medulla.

True

86. (1.00 pts)

The adrenal glands secrete glucocorticoids, mineralocorticoids, and cortical sex hormones.

True

87. (2.00 pts)

Which of the following is/are true of glucagon? Select all that are true.

(Mark ALL correct answers)

- A)Triggered by high glucose
- B)Increases fatty acid oxidation**
- C)Increases protein synthesis
- D)Increases gluconeogenesis**
- E)Secreted by the pancreas**

88. (3.00 pts)

Which of the following is/are true of insulin? Select all that are true.

(Mark ALL correct answers)

- A)Produced by the alpha cells in the islets of Langerhans
- B)Secretion triggered by high glucose levels**
- C)Increases protein degradation
- D)Needs to be supplemented for individuals with Type II Diabetes Mellitus
- E)Interacts with GLUT4 transporters**

89. (2.00 pts)

Which of the following is/are true of somatostatin? Select all that are true.

(Mark ALL correct answers)

- A)Secreted by the adrenal glands
- B)Produced by delta cells**
- C)Increases insulin secretion
- D)Decreases glucagon secretion**
- E)Decreases growth hormone secretion**
- F)Increases aldosterone secretion

90. (6.00 pts)

Describe a single pathway that involves the sensory system, nervous system, and endocrine system. For the sensory system, specify what sense organ is involved and what is sensed. For the endocrine system, specify what hormone(s) is/are involved.

Many possible answers. One example: light sensation (stimulus) through the eye (sense organ) affects the pineal gland (organ) in the brain which affects secretion of melatonin (hormone).

